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The Standard American Diet and Its Relationship to the Health Status of Americans

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The Standard American Diet (SAD) has long been implicated in contributing to the health challenges experienced in the United States. Significant changes to the SAD have occurred since the 1950s, including a greater abundance and accessibility to calorie-dense and nutrient-poor food and beverage choices. The disparity of present consumption patterns to diet and nutrition recommendations from the Dietary Guidelines for Americans are addressed. (*Nutr Clin Pract.* 2010;25:603-612)

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The origins of the Western diet, also referred to as the standard American diet (SAD), can be traced back more than 10,000 years to the Neolithic period. It was during this time that agriculture and animal husbandry evolved, resulting in increases in animal and grain consumption.[1] Today's Western diet or SAD generally refers to a total diet pattern (with multicultural variations) that includes excess consumption of calories from refined carbohydrates, fatty meats, and added fats and that lacks many nutrients found in whole grains, fruits, and vegetables. This dietary pattern, which also includes excess sodium intake, has been blamed for contributing to our current staggering levels of overweight and obesity as well as diet-related diseases and conditions such as type 2 diabetes mellitus, hypertension, and heart disease.[2,3]

Changes in Consumption Patterns in SAD Since the 1950s

The greatest change in the SAD occurred over the past century and may be best represented by the U.S. Department of Agriculture (USDA) data for food availability over the past century, although actual consumption among different age, ethnic, and socioeconomic groups may vary. In evaluating these data, food waste, spoilage, and other losses were also taken into account to determine estimated calorie and nutrient intake based on data from the USDA's Economic Research Service (ERS).[4]

The most significant change in per capita caloric consumption over the past century occurred between the 1950s and the present. Adjusting for loss, it is estimated that average caloric intake increased from 1,900 kcal per capita in the late 1950s to 2,661 kcal per capita in 2008, representing a 761-kcal increase over 58 years. The bulk of the calorie increase (530 kcal) occurred from 1970 until 2000.[4] However, these data may be an overestimate of actual current caloric consumption according to the latest results from the What We Eat in America (WWEIA), National Health and Nutrition Examination Survey (NHANES), 2007-2008, which surveyed 9,255 males and females age 2 and over (excluding breastfed children). Twenty-four-hour recalls on 2 nonconsecutive days from the survey showed that on any given day, Americans consume an average of 2,070 kcal.[5] Another recent study that looked at data from WWEIA, NHANES 2003-2004 and 2005-2006 for men and nonpregnant women 20 years and older compared reported food energy intake with basal metabolic rate and found significant rates of underreporting of total calorie intake or low energy reporting (LER). LER prevalence for men was 17% and for women 25%. For normal-weight individuals, LER prevalence was less than 14%. Women and obese individuals were found to have the highest LER prevalence.[6] Our present day caloric intake likely lies somewhere between NHANES and the ERS estimates.[7]

Of all food sources, grains (mainly in the refined form) and added fats have contributed to the greatest increase in calories since the 1950s (9.5% and 9%, respectively) followed by the categories of added sugars

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(4.7%) and fruits and vegetables combined (1.5%). Meats and nuts combined rose 1%, specifically with Americans consuming 46 lb more poultry, 7 lb more red meat, and 4 lb more fish and shellfish per capita compared with the 1950s. Overall meat consumption increased in men but decreased in women, mainly in the red meat category. The proportion of leaner choices increased as the percentage of fat (mostly saturated) from meat, poultry, and fish changed from 33% in the 1950s to 24% in 2000. Overall dairy calories decreased (–1.5%), with milk consumption falling by 41% by the year 2004 compared with the 1950s, with a trend toward reduced-fat varieties and nondairy, high-calorie beverages replacing whole milk. However, cheese consumption increased 4-fold.[8]

Present Consumption in Contrast to the Recommendations From the 2005 Dietary Guidelines for Americans (DGAs)

The 2005 DGAs encourage Americans to eat nutrient-dense foods including fruits and vegetables (most notably dark green, starchy, and deep orange vegetables as well as legumes—beans and peas), grains (with an emphasis on whole grains), and fat-free/low-fat milk options every day. Lean meats (including beef and poultry), fish, eggs, nuts, and seeds are also recommended as well as foods that are low in added fats and sugars. A daily allotment for discretionary calories—calories derived from foods or beverages that naturally contain fats and sugars or are made with added fats and sugars (such as high-fat meats, butter, or sour cream; or soda, table sugar, candy, or flavored yogurt or milk)—is provided. Discretionary or extra calories can also be used to consume alcoholic beverages or to have larger portions of foods or beverages from the key food groups without going over recommended daily calorie needs.[9]

Grains

Americans consume far more total grains (including those from refined sources) and fewer whole grains than currently recommended. Based on a 2,000-kcal dietary pattern, the DGAs and MyPyramid (MP) recommend six 1-oz equivalents of total grains (with at least half coming from whole grain sources).[10,11] According to the ERS loss-adjusted food availability data, on average, Americans consume an estimated 8.1 ounce-equivalents (oz-eq) of grains per day (2.1 oz-eq more than what's recommended); of that, 7.2 oz-eq are refined grains and only 0.9 oz-eq are whole grains. Americans consume less than one third of the daily recommended number of servings for whole grains.[4]

Lin et al[12] found that an estimated one third of total grain intake was consumed outside of the home and those outside sources only provided one third of an ounce of whole grains. The same researchers suggested that consumers would need 10,000 kcal worth of restaurant food to provide enough whole grains to meet current government guidelines.

Oils and Solid Fats

The 2005 DGAs recommend a total daily fat intake of between 20% to 35% of total calories.[9] It is recommended that monounsaturated and polyunsaturated fats comprise most of the fat Americans consume and that saturated fat makes up less than 10% of the total fat consumed. The guidelines also recommend that trans fat intake "be as low as possible" as there isn't a specific trans fat cap at present. Based on a 2,000-kcal dietary pattern, no more than 27 g (or 6 teaspoons) of oils found in foods such as nuts and seeds, fatty fish, olives and avocado, vegetable oils, trans-fat-free margarines, and salad dressings should be consumed daily.[9]

Unlike fats that count as oils, solid fats are those that are added to foods (including butter and sour cream) or those found naturally in foods (including bacon, sausage, and other fatty meats, and dark meat and skinned chicken). The 2005 DGAs and MP count some or all of the calories from such foods as discretionary calories. In a 2,000-kcal dietary pattern, 267 kcal are counted as discretionary calories that can be used to consume foods made with solid fats, added sugars, or alcohol or to consume larger portions of foods (in their lowest fat, lowest sugar form) from the basic food groups.[9,10]

Data from ERS count added fats and oils together. Unfortunately, total dietary fat consumption is underestimated since fats naturally found in foods such as meats, beverage milks, nuts, and avocados are not included. According to loss-adjusted data, Americans typically consume 71.6 g of added fats and oils per person per day; of that, 59.6 g come from vegetable fats and oils, 9.2 g come from animal fats (including butter, margarine, and shortening), and 2.7 g come from dairy fat (the cream portion of half-and-half, heavy and light cream, sour cream, and cream cheese).[4]

Although the current DGAs call for most fats to come from polyunsaturated and monounsaturated fats and for less than 10% of total calories to come from saturated fat, estimated average intake for monounsaturated, polyunsaturated, and saturated fat is 29.2 g (12% of total calories), 16.4 g (7% of total calories), and 26.3 g (11% of total calories), respectively.[5,9] Although typical daily intake for trans fat is not estimated in WWEIA, the American Heart Association (AHA) recommends a trans fat cap of less than 1% of total energy intake; the 2005 DGAs, the American Dietetic Association (ADA), the Institute of Medicine (IOM), and the National Cholesterol Education

Project (NCEP) all recommend keeping trans fat intake from industrial sources as low as possible.[5,13]

Bachman et al[14] found significant sources of oils in the diet to come from potato/corn/other chips, salad dressing, nuts and seeds and nut/seed mixed dishes, chicken and chicken mixed dishes, and mayonnaise. The highest contributors of solid fats include grain-based desserts, cheese, high-fat meats (including sausage, franks, bacon, and ribs), pizza, fried white potatoes, dairy desserts, and whole milk.[14]

Added Sugars and Sweeteners

The DGAs and MP recommend that Americans choose or prepare foods and beverages with little added sugars and sweeteners. Foods made with added sugars and caloric sweeteners count as discretionary calories. Although current recommendations don't provide a specific cap on added sugars, the DGAs and MP suggest that Americans divide discretionary calories between solid fats and added sugars; for someone who follows a 2,000-kcal dietary pattern, that translates to 18 g of solid fats (4.5 teaspoons) and 32 g of added sugars (8 teaspoons).[9,10,15]

From 2001 to 2004, usual intake of daily added sugars was estimated at 22.2 teaspoons per capita (355 kcal). Based on loss-adjusted food availability data, Americans on average consumed about 30 teaspoons of added sugars and sweeteners per day (120 g or 477 kcal or about 24% of total caloric intake per day) in 2005.[11] According to WWEIA NHANES 2007-2008, Americans consume an average of 120 g of total sugars. Using 2,070 kcal as an average daily calorie intake, this translates to 480 kcal or about 23% of total daily calories coming from added sugars.[5]

About 37% of added sugars consumed in America are from sweetened carbonated beverages; other top sources include sugars and candy; cakes, cookies, and pies; fruit drinks (fruitades and fruit punch); dairy desserts and milk products; and other grains.[14,15] According to Popkin,[16] American adults aged 19 and above typically consume an estimated 411.6 kcal each day from beverages; soda and fruit drinks contribute about 141.72 kcal (34.4% of total beverage intake).

Fruits and Vegetables

Current DGAs and MP suggest that people should ingest a total of 4.5 cups of fruits and vegetables per day (2 cups from fruit and 2.5 cups from vegetables) for a 2,000-kcal/d dietary pattern. DGAs and MP also recommend weekly intakes for vegetable subgroups. Those who consume a 2,000-kcal dietary pattern should aim for a weekly intake of 3 cups each of dark green vegetables (including broccoli, romaine and other dark green leafy lettuces, and spinach), starchy vegetables (including corn, green peas, and potatoes), and legumes (beans and peas); 2 cups of orange vegetables (including carrots, sweet potatoes, and squash); and 6.5 cups of "other" vegetables (including Brussels sprouts, artichokes, asparagus, eggplant, onions, and tomatoes).[5,9,10,14]

According to ERS, loss-adjusted food availability data, Americans consume an average of 0.9 cups of fresh and processed fruit daily (less than half of the recommendation) and 1.7 cups of fresh and processed vegetables (about 68% of what is recommended each day). ERS also estimates that of the various available vegetables, Americans consume 0.2 cups of dark green vegetables, 0.1 cups of orange vegetables, 0.1 cups of legumes, 0.6 cups of starchy vegetables, and 0.8 of cups "other" vegetables each day.[17] Vegetables categorized as "other" or "starchy" (potatoes in particular) dominate Americans' average daily and weekly vegetable intake, whereas legumes rank last in terms of daily vegetable intake. Only about 7.9% of adults consume dry beans and peas daily.[4,5]

Kimmons et al[18] looked at nationally representative 2-day 24-hour dietary recall data from the 2003-2004 NHANES to examine total fruit and vegetable consumption by American adolescents and adults. Only 0.9% of adolescents, 2.2% of adult men, and 3.5% of adult women met their daily recommended needs for fruits and vegetables as outlined by current DGAs. Comparatively, the percentage of participants who consumed enough fruit was higher, with 6.2% of adolescents, 8.6% of adult males, and 12.3% of adult women meeting recommendations for fruit intake. Among those who consumed fruit, median intake ranged from 0.51 cups among adolescents to 0.61 cups among adults. About 18.6% of adults met daily vegetable recommendations; only 5.8% of adolescents met daily vegetable recommendations.[18]

Meat and Beans

DGA and MP recommendations for meat and bean intake (based on a 2,000-kcal diet) are 5.5 oz-eq each day.[9,10] The meat and beans category includes meat, poultry, fish, legumes (beans and peas; these can also be counted as vegetables), nuts and seeds, and eggs. As previously mentioned, a weekly intake of 3 cups of legumes is also recommended. Based on loss-adjusted food availability data, Americans typically consume a total of 6.5 oz-eq of meat and beans (not including legumes), or about 16% more than the recommended amount.[5,9,10]

Milk and Milk Products

The current DGAs and MP recommend three 1-cup equivalents of milk and milk products (including yogurt and cheese) in their lowest-fat form (eg, skim milk, nonfat unsweetened yogurt, and fat-free cheese) each day for a 2,000-kcal dietary pattern.[9,10]

ERS estimates that on average, Americans consume 1.8 cup equivalents of milk/milk products each day, or

about 60% of the daily recommendation.[4] Cheese comprises 0.69 cups, slightly more than one third of the milk/milk products consumed (1.5 oz of hard cheese, 2 oz of processed cheese, or 2 cups of cottage cheese count as a 1-cup equivalent of milk).[4] One limitation of this loss-adjusted availability data is that cheeses are not classified by fat content; therefore, we don't know how much full-fat vs nonfat cheese people consume. Beverage milks also make up slightly more than one third of total milk and milk product intake (0.65 cups); of that, whole milk accounts for 0.22 cups and lower fat or skim milk accounts for 0.43 cups). NHANES 2005-2006 data suggest that American adults typically consume 53.1 kcal/d from whole-fat milk and 23.1 kcal from low-fat milk.[19] Yogurt intake averages 0.03 cups/d. Frozen dairy products, condensed/evaporated milk, and dry milk comprise the remaining 0.43 cups of milk/milk products Americans consume. On average, only 60% of Americans consume recommended daily amounts for milk and milk products (which supply most of the calcium and vitamin D in the diet).[4,5]

About one third of Americans are estimated to meet the adequate intake (AI) for calcium, and 14- to 50-year old females were found to be less likely than same age males to exceed their AI. On average, daily calcium intake is 946 mg.[5] For the vast majority of the population, adequate vitamin D intake may be insufficient given lack of sun exposure and fortified foods in the diet.[20]

Carbohydrate, Fat, and Protein

On any given day, Americans consume an average of 265 g of carbohydrate (50% of total calories), 78.3 g of total fat (33% of total calories), and 78.1 g of protein (15% of total calories). Using percentage of total calories, these values are consistent with current 2005 DGA recommendations that call for 45% to 65% of total calories from carbohydrate, 20% to 35% of total calories from fat, and 10% to 15% of total calories from protein.[5,9]

Fiber

Americans currently consume an estimated average of 15.2 g of dietary fiber each day.[5] Based on the IOM recommendation for daily fiber intake expressed as an AI of 14 g per 1,000 kcal, current intake is about 54%, or about half of the recommended intake level.[20]

Cholesterol, Saturated, and Trans Fats

On average, Americans currently consume 276 mg of dietary cholesterol each day, which meets the current recommendation (<300 mg cholesterol) called for in the 2005 DGAs.[5,9]

Alcohol

In 1977-1978, per capita intake of alcohol among American adults aged 19 and older was 44.9 kcal/d; in 2005-2006, it more than doubled and increased to 115.2 kcal/d (or 28% of total beverage calories); this makes alcohol the second highest contributor (behind sugar-sweetened beverages) to total calorie intake among all beverages (sugar-sweetened beverages rank first).[16] According to WWEIA, males 20 and older consume an average of 14.6 g of alcohol per day; women aged 20 and older consume an average of 6 g of alcohol per day (about 42 kcal, or 2.4% of total calories).[5]

DGAs and AHA recommend up to 1 drink per day for women and up to 2 drinks per day for men (if alcohol is desired and not contraindicated); 1 drink is defined as 5 oz of wine, 12 oz of beer, or 1-1/2 oz of distilled spirits.[9]

Sodium

Although sodium intake among persons in the United States aged ≥2 years was consistent between 2001 to 2002 and 2007 to 2008 (average intake was 3,329 mg and 3,330, respectively), it exceeded the current 2005 DGA goal of less than 2,300 mg of sodium per day by 49% and is more than double the 1,500 mg of sodium recommended for special populations including blacks, those with hypertension, and those aged 40 and older.[5,7,9] An estimated 70% of the American population falls under the special population category and should aim for no more than 1,500 mg of sodium each day.[21]

Potassium

The daily recommended intake for potassium, expressed as AI, is 4,700 mg/d. According to WWEIA NHANES 2007-2008, average daily potassium intake is 2,509 mg, slightly more than half (53%) of the recommendation.[5] Less than 3% of the population is estimated to consume potassium at or exceeding current recommended intake.[22]

Health Implications of a Calorie-Dense and Nutrient-Poor Diet

Our current SAD runs contrary to prevailing science-based recommendations for the prevention of disease. This diet consists of an abundance of foods and beverages that contain added sugars and fats while at the same time lacks in variety and quantity of nutrient-dense foods.[14]

Kant et al[23] showed a significant inverse association for both men and women between poor compliance to present-day dietary recommendations and mortality based on data from NIH American Association of Retired Persons cohort. This was reflected in dietary behavior

scores (DBS), which evaluated consumption of fruits, vegetables, low-fat dairy, whole grains, lean meat and poultry, and discretionary fat, which supply many of the nutrients lacking in the SAD.[23]

Overconsumption of calories in respect to calorie balance is associated with increased risk of heart disease, diabetes mellitus, and certain cancers as well as metabolic dysfunctions. Obesity also plays a role in arthritis and other inflammatory conditions.[24] Excessive calories from sugars has been linked with several metabolic abnormalities such as heart disease, diabetes mellitus and insulin resistance, and other adverse health conditions, as well as displacement of essential nutrients. Welsh et al[25] and others[15] found a statistically significant correlation between added sugars in the diet and blood lipid levels among US adults. It is unknown at this time whether the health detriments due to excessive sugar intake are due to excess caloric consumption contribution or to dietary sugars themselves.

Excessive sodium intake has been associated with prehypertension and hypertension worldwide. It is also a major dietary contributor to stroke, renal disease, and coronary heart disease (CHD).[26,27] Recent studies have shown that reducing Americans' salt intake can provide substantial health and economic benefits. In one study, Bibbins-Domingo et al[28] projected that reducing sodium intake by 1,200 mg/d would reduce the incidence of new cases of CHD by 60,000 to 120,000 per year, stroke cases by 32,000 to 66,000, and myocardial infarctions (MIs) or heart attacks by up to 99,000.[28] The researchers also estimated that there would be 100,000 fewer deaths from all causes. Reducing sodium was projected to save up to 392,000 quality-adjusted life-years and as much as to $24 billion in annual healthcare costs.[28] Another study found that reducing sodium intake by about 10% over a lifetime in adults aged 40 to 85 could result in 514,000 fewer strokes and 480,000 fewer MIs and save an estimated 2.1 million quality of life years and $32.1 billion in medical costs.[29]

Alcohol misuse contributes to vitamin and trace element deficiencies in adults in the United States. Overconsumption has been associated with fetal alcohol syndrome, hepatitis, cirrhosis, anemia, convulsions, encephalopathy, small-bowel dysfunction, depression, anxiety, cardiomyopathy, and hypertension as well as increased risk of cancer of the tongue, mouth, oropharynx, hypopharynx, esophagus, larynx, breast, and liver.[30]

On the other side of the equation, adding in adequate amounts of nutrient-rich foods such as whole grains has been linked to reduced risk of stroke, type 2 diabetes mellitus, heart disease, certain cancers, and obesity and improved insulin sensitivity.[31-36] Epidemiological studies suggest that populations that consume increased dietary fiber have reduced chronic disease. Research supports a reduction in cardiovascular disease risk when adequate levels of fiber are consumed; however, the role of fiber in decreasing cancer risk is unknown. Ironically, the current production of whole grains is in short supply, which makes it impossible for every American to meet the DGAs for fiber.[9,37,38]

Several studies have looked at the relationship between fruit and vegetable intake and incidence of a variety of cancers. Some research has shown consumption of fruits and vegetables to have a protective effect against several different types of cancer. Those with low fruit and vegetable intake (at least the lower one fourth of the population) experience about twice the risk of cancer compared with those with high intake, even after all other factors are controlled.[39]

Several vitamins and minerals have been targeted by the 2005 DGAs as nutrients of concern for inadequate intake in both adults and children.[9] These nutrients include calcium, sodium (excess), potassium, magnesium, vitamin A (as carotenoids), vitamin C, and vitamin E, vitamin B_{12}, iron, folic acid, and vitamin D.

Lane and colleagues[40] found that consumption of antioxidant vitamins A; C, and E, folate, B_6, B_{12}, fiber, and polyunsaturated and saturated fatty acids was inversely associated with risk of developing circulatory disease.[40] Diets low in saturated fatty acids and cholesterol and moderate in monounsaturated and polyunsaturated fats have been associated with low risks and rates of coronary heart disease. Saturated fatty acids are the major dietary factors that raise blood low-density lipoprotein (LDL) cholesterol levels, increasing the risk for heart disease. Increasing evidence suggests that trans fatty acids also can increase LDL cholesterol levels. Reducing trans fat and dietary cholesterol intakes could lead to CHD reduction, but greater risk reduction may be achieved by improving intakes of heart-healthy nutrients currently deficient in U.S. females' diets.[41,42]

NHANES data reveal that those with the greatest calcium intake had lower incidence of osteoporosis and osteopenia.[5,43] The same data showed that those who had the highest calcium intake and optimal 25-hydroxyvitamin D status had better bone mineral density. More than 30 randomized controlled trials have addressed a causal relationship between vitamin D deficiencies in adults and children and disease. More than 90% of blacks, Hispanics, and Asians in the United States suffer from vitamin D insufficiency (25-hydroxyvitamin D <30 ng/mL). Nearly three fourths of the Caucasians in this country are also vitamin D insufficient. Vitamin D deficiency has an adverse impact on skeletal, infectious/inflammatory, cardiovascular, cognitive, and metabolic health in humans.[45,45]

According to WWEIA NHANES 2005-2006, nearly half of all individuals had inadequate intakes of magnesium and the percentage of inadequacy was greater for some gender and age groups.[19] Specifically, more than two thirds of 14- to 18-year-olds and adults 71

and older had inadequate intakes of magnesium.[19] On average, Americans currently consume an estimated 277 mg of magnesium each day.[19] Americans clearly fall short of current recommended dietary allowances (RDAs) for magnesium (420 mg for men and 320 mg for women). Dark green vegetables such as spinach and protein sources such as fish, nuts, and beans are examples of magnesium-rich foods that Americans do not consume in adequate amounts. Although magnesium is an identified nutrient of concern, evidence of magnesium deficiency is rarely reported in the United States. However, literature shows that adequate magnesium stores protects against cardiovascular disease and immune dysfunction.[46,47]

With much of the focus for controlling hypertension being placed on sodium restriction, inadequate potassium intake is often overlooked in playing a positive role for reducing hypertension.[48] Dietary interventions that feature higher potassium intake, such as the Dietary Approaches to Stop Hypertension (DASH) diet, have been shown to be effective in combating prehypertension and stage 1 hypertension.[49]

Why the Increase in Calories? Why Are We Eating More?

Americans are snacking more frequently and consuming a higher percentage of total daily calories from snacks than ever before. Between 1977-1978 and 2003-2006, snacking prevalence among adults was estimated to increase from 71% to 97%; total daily calories from snacks also jumped from an estimated 18% to 24% in the same time period. Currently, 98% of children snack, with an estimated 27% of their total daily calorie intake coming from snack foods.[50] Over the last few decades, Americans have also spent substantially more time in food-related activities, especially those in which it's difficult to gauge energy intake, and less time preparing food, all of which contribute to excess food and calorie intake in America.[50]

Another behavior change that may have contributed to increased caloric consumption is dining away from home. Americans presently spend about 44.3% of their food budget on food away from home.[4] USDA data revealed that dining out constituted 32% of calorie consumption in 1994 to 2006; this reflected an increase of 18% since 1977-1978. Not surprisingly, substantially larger portions and an increased percentage of high-calorie foods are selected when dining out than in the past. Wansink et al[51] found that serving food on larger plates and bowls in restaurants and at home may be also contributing to consumers' confusions over proper portion sizes thus driving increased consumption of calories.[51]

How to Improve What and How We Eat in America

Menu/Calorie Labeling

One measure that can potentially reduce the incidence of obesity in America, by helping consumers make reduced-calorie food and beverage selections when eating away from home, is calorie labeling at chain restaurants. Spearheaded by the Center for Science in the Public Interest (CSPI), the Washington, DC–based advocacy group, and supported by dozens of governmental agencies and health and consumer groups including the ADA, AMA, IOM, the Food and Drug Administration (FDA), the U.S. Department of Health and Human Services (DHHS), and the National Cancer Institute (NCI), the recently passed healthcare reform act includes a nutrition disclosure provision that requires chain restaurants with 20 or more outlets nationwide to list calories on menus, menu boards, and drive-through displays. Vending machines with 20 or more locations must also post calorie information. Other nutrition information (eg, total fat, sodium, sugars) as well as a short statement about how many calories the average person should consume in a typical day must also be provided in writing upon request.[52]

Prior to the passage of the new healthcare reform bill, calorie-labeling measures had been implemented in New York City; Westchester, New York; Kings County, Washington; and Philadelphia, Pennsylvania, and had been enacted (but are awaiting implementation) in California, New Jersey, Maine, Massachusetts, Oregon, and other city and states. Specific regulations that will be proposed by the FDA by March 2011 will trump those set at state and local levels. The FDA will also be required to provide quarterly reports to Congress on the progress of the legislation.

Unfortunately, few data are available on the real-world effects of posting calorie content of foods on actual calorie intake. Preliminary study results are mixed; some show that calorie posting leads to small reductions in number of calories purchased, whereas others show no such beneficial effect. An unpublished study from Stanford University involved collecting more than 100 million Starbucks receipts in Boston, New York City, and Philadelphia and surveying customers for a total of 14 months (3 months before and 10 months after calorie posting provided). On average, customers purchased 6% fewer calories (almost all from food purchases) after calorie posting (source). Those who purchased more than 250 kcal prior to calorie posting reduced their calorie purchases by 26% after calorie posting. The researchers concluded that having calorie information available at the point-of-purchase can have a beneficial impact and help consumers purchase and consume fewer total calories. Lewis et al[53] found that those test subjects with chronic

disease were more aware of nutrition recommendations, checked more often for specific nutrients, and used nutrition information on food labels more often than did participants without chronic disease; however, label use behavior was inconsistently associated with dietary guideline compliance.

Salt Reduction

In January 2010, the New York State Department of Health unveiled the National Salt Reduction Initiative. This public–private partnership of cities, states, and health organizations set specific targets for sodium levels in 62 packaged food categories and 25 restaurant food categories. Food manufacturers and restaurants are to voluntarily lower sodium levels of processed, packaged, and restaurant-prepared food by 25% over the next 5 years. Achievement of this goal would lower Americans' sodium intake by 20% and lower the risk of heart attacks, stroke, and premature death.[54] As of April 2010, 18 national health organizations (including ADA, AHA, and AMA); 29 cities, states, and related entities; and 16 companies including Au Bon Pain, Boar's Head, FreshDirect, Goya, Hain Celestial, Heinz, Kraft, LiDestri, Mars Food, McCain Foods, Red Gold, Starbucks, Subway, Unilever, Uno Chicago Grill, and White Rose had made formal commitments to the National Salt Reduction Initiative.[54]

The Institute of Medicine[55] unveiled a report titled *Strategies to Reduce Sodium Intake in the United States* in April 2010. This report is a response to a request by Congress to create strategies to help Americans reduce their daily sodium intake to recommended levels. The report recommends a coordinated approach to reducing the sodium content in foods slowly and gradually. It urges the FDA to create mandatory national standards for the sodium content in foods and to modify the Generally Recognized as Safe (GRAS) status of salt and other sodium-containing compounds added to processed foods (eg, change the level to which the use of such compounds is considered safe). The report also recommends that a national campaign to reduce sodium intake be created with a clear timetable for achieving objectives. Finally, the report calls for improved monitoring of Americans' sodium intake and better efforts from food manufacturers to help Americans reduce their intake and preference for highly salted foods.

Population-wide sodium reduction initiatives have been successfully implemented in several countries. For example, in 2003, the United Kingdom launched a sodium reduction campaign that led to substantial decreases in the amount of sodium found in processed and packaged foods and subsequent significant reductions in the nation's sodium intake. Canada, Australia, Finland, France, Ireland, and New Zealand have also launched national initiatives to reduce sodium in the food supply.[56,57]

Soda Tax

As a way to promote public health, a substantive tax on sugar-sweetened beverages has been considered over the past decade as a way to generate revenue, reduce consumption of nutrient-poor beverages, curb obesity rates, and improve Americans' overall health. Studies have linked soda consumption with obesity, type 2 diabetes mellitus, and heart disease. Over the last 50 years, soda intake has increased nearly 500%; in the last decade alone, soda became a significant calorie contributor to the American diet.[58]

Although few states currently impose an excise tax on sugar-sweetened beverages, many states tax these beverages at a higher rate than other food products. As of January 1, 2009, 33 states applied a sales tax to soft drinks, at an average rate of 5.2%. The average sales tax on soft drinks for all states (including those that don't tax them) was 3.4%, more than triple the 1% average applied to foods and beverages in general.[59]

A federal tax on soda and other sugar-sweetened beverages is currently being considered among other viable options as a way to pay for expanded health insurance for Americans. Although emerging studies suggest that small taxes on sugar-sweetened beverages may not affect obesity rates in America, a recent study showed that when the price of soda rose by 10%, consumption dropped by an average of about 7%. Other studies suggest that larger taxes can also have a beneficial impact on heart disease and type 2 diabetes mellitus risks and save hundreds of millions of dollars in annual healthcare costs.

The Congressional Budget Office[60] estimates that adding a tax of 3 cents per 12-oz serving of soda and other sugar-sweetened beverages would generate $24 billion over the next 4 years and $50 billion over the next decade. Advocates for the soda tax, including Centers for Science in the Public Interest (CSPI), suggest that at least some of the money raised from a soda tax should be used for programs or marketing strategies that promote healthful eating and fitness habits.

Nutrient Profiling

Nutrient profiling is the science of ranking foods based on nutrient composition; over the past several years, numerous nutrient-profiling systems have been created to help guide consumers on improving the quality of their diet. One of the most popular examples is the NuVal scoring system, which ranks a food's nutrition worth based on a scale of 1 to 100 (with 100 being the best in class). This system was created by David L. Katz, MD, MPH, FACPM, FACP, of the Yale-Griffin Prevention Research Center, along with a panel of health and science experts.[61] However, the concept of nutrient density remains weakly defined and not universally agreed upon. The consumer application of

nutrient density presents many unanswered questions. Long-term data demonstrating the benefits of nutrient profiling are not available at this time.[62,63]

Other Strategies

Several other strategies are being considered to improve the SAD, including mandatory front-of-package labeling providing nutrition information; restrictions on sales of soda and other sugar beverages, candy, and other nutrient-poor foods in schools; and, most recently, First Lady Michelle Obama's Let's Move campaign, to name a few.

Conclusion

Our present dietary pattern combined with inactivity may be the driving force behind many of the health challenges we face in the United States today. Americans are not unaware of this connection. In 2009, Americans spent an estimated $59.7 billion annually on weight-loss products and services each year while simultaneously battling an overabundance of food choices driven by billions of dollars spent annually on marketing nutrient-poor foods. It is not surprising that Americans continue to be overfed and undernourished.[64]

All of the previously mentioned initiatives have merit in improving our SAD. Unfortunately, most of them target only one side of the challenge of the SAD: limiting "negative" nutrients. Nutrient profiling systems take both negative and positive nutrients into account, but there is disagreement among food and nutrition experts as to which algorithm best determines a food's nutrition worth. Krebs-Smith et al[65] found that even if all Americans were familiar with the DGAs and were simultaneously motivated to follow them, many foods promoted in the DGAs are not being produced in sufficient quantities to meet present dietary recommendations for each American. Fruits, vegetables (specifically dark-green/orange vegetable varieties and legumes), whole grains, and milk products are in short supply, whereas foods containing saturated fat, sodium, and calories from solid fat, added sugars, and alcoholic beverages are abundant and easily accessible, especially in impoverished geographical areas.[65]

To bridge the gap between what Americans currently consume and what we need to consume to better manage weight, prevent diet-related diseases and conditions, and optimize overall health, substantial shifts need to be made so that the foods and beverages available at home, in local restaurants, at academic institutions, in the workplace, and in the U.S. food supply are consistent with and enable us to better follow current revision of the DGAs. It will take a coordinated effort between all concerned parties to implement these necessary changes to turn idealistic dietary guidelines into reality. More effective science-based strategies for nutrition communications must also be adopted as Americans continue to be enamored with deprivation diets and restrictive eating approaches as the solution to the consequences of over consumption. Little research is available to support a restrictive approach to improving our long-term health. Instead, educational messages should focus on adding in nutritious foods while associating nutrition and chronic disease risk with high consumption of foods and beverages that are energy-dense yet nutrient-poor. Additionally, the promotion of regular physical activity and exercise is a worthy partner in optimizing our nation's health and well-being.

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